Name:

at1117paper: Complete the Square (v319)

Example

A square's edge length is x feet. A rectangle has a height of x feet and a width of 50 feet. Their combined area, found by adding the square's area and the rectangle's area, is 600 square feet. What is the value of x?

Example's Solution

$$x^2 + 50x = 600$$

To complete the square, add $\left(\frac{50}{2}\right)^2 = 625$ to both sides.

$$x^2 + 50x + 625 = 1225$$

Recognize the left side is now a perfect-square trinomial. Factor the left side.

$$(x + 25)^2 = 1225$$

Undo the squaring.

$$x + 25 = \pm\sqrt{1225}$$

$$x + 25 = \pm 35$$

Subtract 25 from both sides.

$$x = -25 \pm 35$$

In this geometric example, we are only concerned about the positive solution. So,

$$x = 10$$

Question 1

A square's edge length is x feet. A rectangle has a height of x feet and a width of 50 feet. The total area, of the square and rectangle, is 1491 square feet. What is the value of x?

$$x^2 + 50x = 1491$$

$$x^2 + 50x + 625 = 2116$$

$$(x + 25)^2 = 2116$$

$$x + 25 = \pm 46$$

$$x = 21$$

Question 2

A square's edge length is x feet. A rectangle has a height of x feet and a width of 34 feet. The total area, of the square and rectangle, is 552 square feet. What is the value of x?

$$x^2 + 34x = 552$$
$$x^2 + 34x + 289 = 841$$
$$(x + 17)^2 = 841$$
$$x + 17 = \pm 29$$
$$x = 12$$

Question 3

A square's edge length is x feet. A rectangle has a height of x feet and a width of 48 feet. The total area, of the square and rectangle, is 793 square feet. What is the value of x?

$$x^2 + 48x = 793$$
$$x^2 + 48x + 576 = 1369$$
$$(x + 24)^2 = 1369$$
$$x + 24 = \pm 37$$
$$x = 13$$